



MONTANA AERONAUTICS COMMISSION



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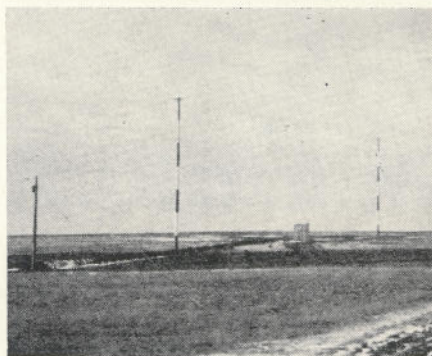
3 EASTERN MONTANA HOMERS ARE TURNED ON

Location MALTA	Frequency 272 kc Code — — • • • — —	Identifier MLK
Location PLENTYWOOD	Frequency 251 kc Code • — — • • — — • •	Identifier PWD
Location JORDAN	Frequency 263 kc Code • — — — — • • • — —	Identifier JDN

The turn on of the H-Markers (non-directional radio beacons) culminated many months of effort which began with the selection of Jordan, Malta and Plentywood from a long list of fourteen (14) interested Montana communities. These locations were chosen as the first communities to receive H-markers due to the virtual absence of navigational aids in this part of Montana.

The electronic equipment which has been installed at these locations is a Southern Avionics Company model H25A transmitter with monitor, antenna, and counterpoise system of the same manufacture. Due to more elaborate and expensive counterpoise and antenna systems than are usually used, the range and signal quality of these beacons has been substantially improved. This is evidenced by the loud and clear sig-

nal from the Malta H-marker monitored by the Aeronautics Commission installation crew from the ramp at Sherwood airport in Plentywood.



An example of an H marker installation.

So now when you fly VFR in the vast expanses of Eastern Montana, merely tune in 272 kc, 251 kc, and 263 kc for instant and welcome company.

STANFORD DEDICATES NEW PAVED AIRPORT

In spite of stiff winds, the dedication of Stanford's new airport on December 2nd was well attended. Twenty-five aircraft arrived and several hundred persons attended the ceremonies.

The day's activities commenced with a fly-in breakfast between 8:00 and 10:00 A.M. The Stanford band

played until the opening of the Dedication Ceremonies at 10:30. Mr. Don Anderson was Master of Ceremonies. Stanford's Mayor, Mr. Frank Dusek gave the welcome, followed by Mr. Rudy Larson, Judith Basin County Commissioner, relating the story of the airport's development. Mr. Charles A. Lynch, Montana Aeronautics Commission's Director, was the Dedication speaker and spoke on "Growth in Air Transportation Needs."

Aaro Samson, area rancher/pilot, performed the Ribbon Cutting—Aaro snipped the ribbon, extended above the new runway, with the propeller of his airplane (accomplished on the very first pass).

The new paved runway, which replaced the old dirt runway, is 3,500 feet long and 75 feet wide with a total cost of \$38,000. Contractor, Francis Tindall of Lewistown generously paved the runway for the same price that he bid on the original job for a turf runway.

The airport, in addition to serving the flying farmers and ranchers, businessmen in the area and transit pilots, can be used for crop spraying operations, emergency landings and by the Forest Service in the event of forest fires.

The Stanford Commercial Club deserves hearty applause for the arranging of the day's well planned activities!!

**Official Monthly Publication
of the
MONTANA AERONAUTICS
COMMISSION**

**Box 1698
Helena, Montana**

Tim Babcock, Governor

Charles A. Lynch, Director

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Vice Chairman**

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**FLIGHT SCHOOLS
REGULATION AMENDED**

**FAA regulation (Part 141)
changed effective 12/13/67**

Subchapter H — Schools and
Other Certificated Agencies
(Docket No. 8587; Amdt 141-6)

**PART 141 — PILOT SCHOOLS
Approval of Pilot Training Courses**

The purpose of these amendments to Part 141 of the Federal Aviation Regulations is to provide rules under which the FAA will approve pilot training courses, that were not previously included in that part. Under the rules of these amendments a certificated pilot school may obtain FAA approval for pilot courses providing instruction for the following purposes:

- (1) The addition of an aircraft category or class rating, or an original or additional type rating, on a pilot certificate.
- (2) The addition of a rating on a flight instructor certificate.
- (3) The proficiency required of an applicant for an airline transport pilot certificate.
- (4) The proficiency required of an applicant for a rotorcraft external-load operator certificate or his designated chief pilot.
- (5) The proficiency required of an applicant for an agricultural aircraft operator certificate or his designated chief supervisor.

Part 141 provides for the issuance of certificates and associated ground, flying, and flight instructor school ratings that may be issued to pilot

schools. It also prescribes, among other things, the detailed standards for the instruction given by schools with each of these ratings. However, the part does not provide for the approval of many of the additional pilot training courses given by some certificated schools to serve the need of certain pilots.

Some requests have been received in the past for the extension of the provisions of Part 141 to include additional courses of ground and flight instruction, and these have been under consideration in connection with a contemplated revision of Part 141. However, many more requests have been received recently from certificated schools, since enactment of the Veterans' Pension and Readjustment Assistance Act of 1967. This Act, effective October 1, 1967, provides for reimbursement from the Veterans Administration to eligible veterans for flight training "generally accepted as necessary for the attainment of a recognized vocational objective in the field of aviation". Two conditions are attached. First, the eligible veteran must have a valid private pilot certificate (or have satisfactorily completed the number of hours of flight training required therefor), and at least a second-class medical certificate. Second, the "flight school courses must meet the Federal Aviation Administration standards and be approved both by that Agency and the appropriate State approving agency." It has not been possible for courses to meet the second condition, without FAA standards not already provided by Part 141.

To draft, propose, receive industry comments, and then issue a final rule containing detailed standards for pilot training courses to be given by certificated pilot schools, in the same manner as is done for pilot school ratings, can be satisfactorily accomplished only over a substantial period of time. This would delay implementing the purposes for which financial assistance to veterans in this field is contemplated by the recent legislation.

Therefore, as an interim measure pending consideration in connection with the contemplated revision of Part 141, these amendments are issued to provide the basis for FAA approval of the listed pilot training courses given by certificated pilot schools to students with at least pri-

vate pilot certificates (needed for additional ratings to be attached to certificates, or for meaningful particularized proficiency).

Course approval will be afforded to certificated pilot schools — those that already have shown capability to provide the instruction necessary for the pilot and instructor certificates (and ratings thereon) ordinarily sought upon graduation from the schools. Under the Veterans' Benefits legislation, enrollment of an eligible veteran in a course may not be approved unless the course (or one similar in character) has been given by the institution involved for at least 2 years—a limitation not suitable for incorporation in these amendments of general applicability, but nevertheless limiting in scope with respect to schools desiring course approval under the recent legislation.

The courses eligible for approval under these amendments are set forth in a new Subpart D added to Part 141. As a standard for course approval, the school must show that the course provides adequate instruction for a graduate of the course to achieve the desired objective. Thus, the school must show in its application that a course in preparation for an additional category, class, or type rating (or original type rating) under Part 61 provides adequate instruction for a graduate of the course to perform the required procedures and maneuvers for the appropriate practical test for that rating. Likewise, a school must show that a course in preparation for the addition of a rating on a flight instructor certificate provides adequate instruction for a graduate of the course to pass the required written and practical tests. In the case of a course preparing students for airline transport pilot certificates, the school must show that the course provides adequate ground and flight instruction for a graduate of the course to pass the required written and practical tests for that certificate. Part 141 (like its predecessor Part 50 of the Civil Air Regulations) has not provided a rating and curriculum for the conduct of an airline transport flying school. Now there are numerous discharged military pilots with commercial pilot certificates, instrument ratings and ample flight time, who desire to obtain training that will prepare them to pass the

tests for airline transport pilots certificates.

With respect to courses leading to proficiency in a particularized vocational occupation, namely, rotocraft external load or agricultural aircraft operations (the two now covered), the school must show that the course provides adequate instruction for a graduate of the course to show the knowledge and skill regarding the particular operation required by Part 133 or 137 of the Federal Aviation Regulations, respectively.

It is considered that this standard sufficiently assures, prospectively at the time of course approval, that an approved course will accomplish the objective, at least as an interim measure without the details of instruction that are required for certificated flying school ratings.

Under these amendments, the pilot school seeking course approval must accompany its application with a proposed course curriculum including the actual course content, facilities and equipment appropriate for the course objective, and qualifications of instructors to be used for the particular course. Thus, for approval of a multiengine course, multiengine aircraft suitable for flight instruction must be furnished. Similarly, the instructors used must have ratings appropriate for the instruction they give.

As a requirement applicable promptly after the course has been approved and in operation, these amendments add to § 141.11 (a) a requirement that the quality of the instruction must be such that, of the course graduates who apply for a rating or an airline transport pilot certificate within 60 days after they are graduated, at least eight out of each 10 most recent graduates tested by an FAA inspector qualify on their first test for the particular rating or certificate. Courses for particularized vocational proficiency as in rotocraft external-load or agricultural aircraft operations, do not lead to ratings. In these situations, the amendments require at least eight out of 10 students enrolled in such a course to show competence in pre-graduation tests under the procedures of § 141.11 (c) already applicable to determine a pilot school's compliance with its school curriculum and instruction quality. Other general provisions of Part 141 by their context will apply to these courses,

namely the balance of § 141.11, § 141.13 (Student tests), 141.21 (Records), and 141.25 (Inspections).

Applications for course approval may be made in writing to the FAA District Office having jurisdiction over the area in which the pilot school is located. GADO No. 1, Administration Building, Logan Field, Billings, Montana.—GADO No. 9, City/County Airport, (Box 1167), Helena, Montana.

'67 AERO CHART AVAILABLE FOR IMMEDIATE DELIVERY

The complete order of the Montana Aeronautical Chart '67 is on hand and available for distribution to individuals and on bulk orders.

To attract Montana pilots to tour Montana, and out-of-state pilots to visit our state, the new chart has an array of photographs depicting a few of our many natural wonders.



A new Montana Aeronautical Chart opened to show the photographic array of "places to see," "things to do" in Montana.

One single copy of the chart is being provided to all registered pilots (in addition to the airport directory). Other interested persons may purchase a copy of the chart for \$1.00.

Packages are available to General Aviation Operators at a 25% discount for resale.

A limited number of courtesy copies are available for review by State and Federal Agencies, Libraries, Schools and out-of-state interested groups or individuals.

Storage tanks aboard the Apollo spacecraft service module are so well insulated that an ice cube placed inside would take seven years to melt.



CALENDAR

January, 1968—Registration due for:

Pilot Registration
Aircraft Registration

Commercial Air Operator Insurance
January 6, Spokane, Washington
—International Northwest Aviation Council's Board of Directors Meeting.

January 10-11, Helena—Montana Aeronautics Commission's monthly meeting.

January 21-24, Las Vegas, Nevada
—(Stardust Hotel) 20th Annual Meeting and Helicopter Showcase of the Helicopter Association of America.

January 25, 26, 27, Billings—Montana Aviation Trades Association Annual Convention.

February 6, 7, 8, Bozeman—Aerial Radiological Monitoring Course. The course will be held at the Montana State University, Student Union Building, Room 142. Participants will receive registration forms by mail.

March 3, Great Falls—Flight Instructors Refresher Course Registration Day.

March 4-8, Great Falls—Flight Instructors Refresher Course.

April 12, Lewistown—Montana Airport Managers Association Annual Meeting—Headquarters, Yogo Inn.

May 3, 4, 5, Cut Bank—Montana Pilots Association Annual Convention.

PILOTS:

Have You Applied For
1968 Registration?

* * *

AIRCRAFT OWNERS:

Is Your Aircraft Registered
For 1968?

* * *

COMMERCIAL AIR OPERATORS:

Has Your "Proof of Insurance"
Been Submitted to the
Aeronautics Commission?

* * *

If the Answer Is "No"
DO IT TODAY!!

If you need one or all of the necessary forms, drop a postcard to the Montana Aeronautics Commission, P.O. Box 1698, Helena, Montana 59601.

AIRPORT NOTES



By James H. Monger
Assistant Director, Airports

Jordan—The 3200 foot paved runway at Jordan is now fully lighted. Garfield County had a Manairco low intensity lighting system installed a few weeks ago and it is now operating from dusk to dawn every night. The Aeronautics Commission previously installed a beacon on the Jordan Airport.

Three Forks—The Three Forks Airport now has a pay telephone and it is located on the outer wall of the small administration building on that airport. The Montana Aeronautics Commission was able to assist the town and the Gallatin County Airport Board by contacting the telephone company and explaining the vital need for the pay telephone. The main selling point to the telephone company was the fact that the phone would be used primarily for opening and closing flight plans through the Montana Pilot Flight Plan Program inaugurated by this office four years ago.

Since the Flight Plan Service has been in use, approximately 11,000 calls have been made at an average cost of \$0.76 each. It is assumed that the Flight Plan Service has substantially reduced the need for many search and rescue missions, both telephonic and actual.

Harlem—Blaine County recently lighted the 3500 foot runway at Harlem. A low intensity Manairco lighting system was installed and Harlem will soon receive a small low power rotating beacon for the airport. The beacon will be provided through the Aeronautics Commission beacon program.

East Glacier—On December 13th, the Aeronautics Commission met and at that time approved the submission of a request for aid to the Federal Aviation Administration for an airport project at East Glacier. The Aeronautics Commission requested \$50,806 from the FAA and this money will be matched with National Park Service funds in the amount of \$45,-

000. The request was specifically placed for the purpose of conducting a land survey, preliminary engineering, land appraisals, and land acquisition at the location which eventually will become the East Glacier Airport. No construction funds were requested due to the fact that the size and category of airport is yet undetermined. It was felt that in the best interests of good planning, land acquisition should be taken care of as soon as possible, along with sufficient engineering and an economic study which would determine the feasibility of a given sized airport for the future.

Fiscal Year 1969—Federal Aid—

The FAA has six (6) requests for aid for inclusion into the fiscal year 1969 Federal Aid to Airport Program. The requests total \$2,951,490. It is expected that Montana will only have one and one-half million dollars of Federal grant funds available for the total of fiscal year 1969. The funds requested are only Federal funds from the FAA and do not include the 46.97% local funds:

Billings Logan Field—\$294,847 primarily for taxiway modification and runway strengthening.

East Glacier—\$50,806 land acquisition, engineering and other studies.

Great Falls—\$27,011, construct taxiway and visual approach slope indicator light units on runway 21.

Helena—\$675,616, land acquisition, runway extension, along with runway and taxiway overlay.

Kalispell (Flathead County)—\$528,133, land acquisition, runway extension and overlay, taxiway construction.

Missoula—\$1,384,077, land acquisition, runway extension, and runway and taxiway overlay, general aviation apron construction and other pertinent work.

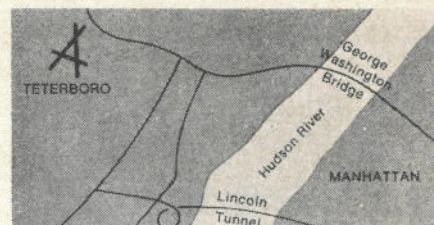
STATISTICS

Will your **first** accident be your **last** day alive?

61/37
65/22
78/18
69/18

	ACCIDENT TOTAL	FATALITIES
1964 Total	61	37
1965 Total	65	22
1966 Total	78	18
1967 Total To-Date ..	69	18

TETERBORO—NEW YORK'S GENERAL AVIATION AIRPORT



Teterboro, conveniently located in northeast New Jersey, is the quickest airport to New York City for the general aviation operator. General aviation operators using Teterboro can take advantage of the convenience of a variety of transportation services and eliminate time-consuming air traffic delays at other airports.

New Airport Coach: Teterboro Airport is only 20 minutes via airport coach. The new coach service connects Teterboro and the West Side Air Lines Terminal at 42nd Street and 10th Avenue in New York City. It is operated by Carey Transportation for the Port Authority and airlines to provide general aviation passengers with fast, reliable transportation to the City.

Helicopter: New York Airways, the helicopter airline, provides daily round-trip service to the Midtown Heliport atop the Pan Am Building in Manhattan. Direct service is provided to Kennedy International and connecting flights can be made to LaGuardia Airport. NOTE: Fares and flight schedules can be obtained from the New York Airways passenger terminal at Teterboro.

Airport Limousine Service: Chauffeured limousines operated by Teterboro Airport Ground Transportation, Inc. are available 24 hours a day to any destination. (Advance reservations are suggested.) Scheduled limousine service to LaGuardia and Kennedy Airports is provided by New Jersey and New York Limousine Service, Inc. Reservations can be made on one hour's advance notice. NOTE: The limousine waiting area is in the same Passenger Lounge as for the Carey coach.

Car Rentals: Direct-line telephones to Avis and Hertz car-rental companies are located in the Passenger Lounge of the Atlantic Aviation Hangar. Cars are delivered to pa-

trons at the airport and standard rental rates apply.

Taxi Service: Taxicabs from neighboring towns are available on call.

Public Bus: Public bus service is provided by the Manhattan Transit Corporation Inc. between the airport and the Port Authority Bus Terminal in mid-Manhattan.

Teterboro—an airport just for general aviation. No time-consuming delays due to carrier traffic—IFR Capability with low approach minimums—Full Instrument Landing System—High Intensity Approach Light system with sequenced flashers—FAA Control Tower—Two 5,000 foot runways—Flight Service Station—Weather information—Service and Maintenance facilities to serve the complete range of general aviation aircraft—Low take-off fees.

LETTERS TO THE DIRECTOR

I am pleased to share my annual letter from Joe Lavallee, former Montana Flight Instructor from Glasgow, presently employed with the Ethiopian Airlines in Addis, Ababa, Ethiopia.

C. A. Lynch

Addis Ababa, Ethiopia
December 15, 1967

Howdy:

Merry Christmas and a Happy New Year from Ethiopia. Actually, it's neither one here. New Year's Day in Ethiopia falls on Sept. 11. This is the year 1960 on the Ethiopian calendar. And Christmas falls on January 4. The Americans get off on the 25th and the 1st, so we celebrate two Christmasses and two New Years each year.

The Christmas celebration is nothing like in the States. Some merchants put up a few colored lights in their store windows and that's it. But the foreign community does it up just fine. No snow on the ground but lots of ice in the glass.

Ethiopia is one of the oldest Christian nations. The country has a recorded history which goes back some 3,000 years—long before the birth of Christ. It seems the whole thing started as the kingdom of Axum. And do you know who ruled that kingdom? Why, the Queen of Sheba of course. One day the queen journeyed to Israel and visited with King



Joe Lavallee shown with the 1967 Graduating Class. (Joe says, "I'm the foreigner in uniform.")

Solomon. The Kink was a gracious host and the Queen bore a son which was named Menelik. So started the written history of Ethiopia some 2500 years ago. Young Menelik grew up, ascended the throne and took the title of Menelik I. And to this day, the Solomonid dynasty still rules Ethiopia. The present sovereign, His Imperial Majesty Haile Selassie I, Elect of God, Lion of Judah, King of Kings, traces his lineage to the Queen of Sheba and King Solomon.

We had a nasty accident recently. One which resulted in the loss of 50% of the country's general aviation fleet. An Apache was reported missing on a flight to Asmara—about 50 miles north of Axum. It took us six weeks to find the wreckage. At first, there was an aura of mystery about the whole thing. The airplane was completely demolished but there were no bodies ever found. It seems that the natives stripped the bodies and the hyenas disposed of the rest.

Our training program is coming along nicely. We're in the Cross Country phase at present and plan to start night flying next month. I'm trying to organize a flying club at the Haile Selassie University. It's amazing the lack of interest in flying in this country. I'm hoping my flying club will foster a little airmindedness.

Hope the New Year finds everyone healthy and prosperous.

Joe Lavallee

HAVE YOU SEEN ?

THE NEW PILOT'S HANDBOOK

published by the Aircraft Owners and Pilots Association titled "The AOPA Handbook for Pilots". The handbook is intended as a quick reference source of aeronautical information useful to general aviation pilots and aircraft owners while on the ground and in flight. The pocket-sized, 192 page document deals with almost every aspect of private aircraft use from preflight procedures to instrument operations.

Information included: liberally illustrated sections covering aeronautical conversion tables and aircraft performance computations; air navigation; flight preparation; weather; enroute procedures; emergency procedures; addresses and services; international operations; and selected FAA regulations with which pilots and aircraft owners should be familiar.

Cost of the handbook is \$3.50 for AOPA members and \$5.50 for non-members and is available from association headquarters, P. O. Box 5800, Washington, D.C. 20014.

In Alaska one out of every 49 persons is an active airplane pilot.

VFR COMMUNICATIONS FOR GENERAL AVIATION

Following is a partial reprint of the FAA's Advisory Circular, No. 90-33, which describes VHF (118-136 MHz band) air/ground communications channel utilization for general aviation aircraft in the VFR environment and includes information on the use of channels in the private aircraft (122-123 MHz) band recently made available by the Federal Communications Commission (Docket 17177). **Common Channels** The number of channels that the VFR pilot will need depends on the area of his operations and the extent of the service he wants. In areas which are not congested and where the flight operations are consistently confined to specific airports, the common channels listed may be adequate. However, 90-channel capability is needed to obtain full VFR service throughout the National Airspace System (NAS) particularly when aircraft are operating into busy multiple-terminal areas.

Implementation And Use The new FSS frequency 122.6 was implemented on November 9, 1967, while gradual increased use of 122.2 and 122.3 will be made as funds and equipment become available. These frequencies will be included in the Airman's Information Manual and the enroute low-altitude and the new sectional charts. The frequency 122.0 MHz (weather channel) is not expected to be in full use for some time but may be assigned earlier at certain FSS's for weather communications to relieve congestion on other FSS channels.

Summary and Recommendation For VFR operations, the Federal Aviation Administration suggests a 90-channel communications capability, noting that the channels listed below may be adequate depending on the extent of flying activity and the areas of use. For unrestricted IFR operations, 360-channel communications capability is necessary.

VHF COMMON CHANNELS

The frequencies herewith tabulated are common to the system and, where assigned, will usually permit the limited radio-equipped aircraft to obtain basic VFR services. These common frequencies, as well as the discrete 100 kHz channels below

127.0 MHz, are all within the tuning range and operating capability of 90-channel equipment. Except as noted, the channels are simplex (transmit and receive on the same frequency).

- a. 121.5—Emergency
- b. 121.6—Control Tower, Ground Control
- c. 121.7—Control Tower, Ground Control
- d. 121.8—Control Tower, Ground Control
- e. 121.9—Control Tower, Ground Control
- f. 122.0—FSS's, Weather (future), General Aviation and Air Carriers at selected stations
- g. 122.1—FSS's Receive-Only
- h. 122.2—FSS's
- i. 122.3—FSS's
- j. 122.4—Control Tower, Receive-Only
- k. 122.5—Control Tower, Receive-Only
- l. 122.6—FSS's
- m. 122.7—Control Tower, Receive-only
- n. 122.8—UNICOM, Non-Tower, Non-FSS Airports
- o. 123.0—UNICOM, Tower and FSS Airports
- p. 123.6—FSS's, Airport Advisory Service.

FEDERAL AVIATION ADMINISTRATION INTINERARY LISTING



Airport	Jan.	Feb.	March
Culbertson	.....	7	.....
Glasgow	10	.....	13
Glendive	25	.....	28
Great Falls	4	8	7
Lewistown	.....	21	.....
Miles City	.....	28	.....
Missoula	18	15	21
Sidney	24	.....	27

NOTE: Provisions have been made to give private, commercial and flight instructor and instrument written examinations, **ON AN APPOINTMENT BASIS ONLY** at the following FAA Flight Service Stations:

Bozeman	Lewistown
Butte	Livingston
Cut Bank	Miles City
Dillon	Missoula
Great Falls	

Recently an airplane salesman lost a sale in Nigeria when a witch doctor sprinkled black powder on a newly delivered aircraft and put a "spell" on it. The superstitious customer then refused to buy it.

FAA INSPECTORS' CORNER



By LAUREN D. BASHAM
GA Operations Inspector
GADO No. 9

How well do you know your airspeed indicator—are you aware of the many items of information and misinformation it can give? For instance, did you know that there are at least a dozen speeds that every pilot should be acutely aware of in order to achieve the maximum in operational performance and efficiency as well as design safety?

Let's take a close look at that airspeed indicator starting at the 0 indication.

Does your airspeed indicator indicate 0 while at rest in the hangar? If it doesn't, it is entirely possible that it doesn't indicate properly when in flight.

Does your airspeed indicator indicate at the bottom of the white arc (V_{so}) during a power off stall with the gear and flaps down? Don't be alarmed if it doesn't because the colored arcs on the airspeed indicator dial mark **calibrated airspeed** which is indicated airspeed corrected for installation and instrument error. A considerable difference may exist between **indicated** and **calibrated** airspeed because of the variation in the way the static atmosphere enters the pitot tube in various flight attitudes.

Next, we observe the bottom of the green arc (V_{sl}), the stalling speed with the gear and flaps up. Similarly, a variation may be noted here. An aircraft is designed to operate most of the time within the upper limits of the green arc and so the indicated error is normally at a minimum within this arc.

It has now become obvious that a pilot should know what error, if any, exists in his airspeed indicator and the place to determine this is by reference to the **airspeed correction table** in the aircraft handbook.

Next, we observe the top of the white arc which is the maximum speed for extension of flaps (V_f). A note of caution is in order here for quite often the G tolerance of the aircraft structure is reduced in pro-

portion to the amount of flap extended, making it quite possible to exceed the structural integrity of the aircraft wing while in flight.

The airspeed must always be reduced to within the flap operating range or white arc before actuating the flaps to the fully extended position.

Then we have the upper limit of the green arc and lower limit of the yellow arc which is the maximum speed for normal operation (V_{no}). Between maneuvering speed ($2 \times V_{so}$) and the top of the green arc, the aircraft has structural integrity to withstand 30 fps sharp edge gusts. From the top of the green arc to the red line or Never-Exceed-Speed (V_{ne}) which is 90% of the design dive speed, the aircraft has structural integrity of 15 fps sharp edge gusts — this is the yellow arc on the dial and the pilot should use extreme caution when operating in this area.

There are several speeds with which the pilot should be familiar that are not marked on the airspeed indicator dial.

1. The **best-angle-climb speed** (V_x), the speed which gives the maximum gain in altitude for a given distance. This speed is necessarily used in the performance of short field takeoffs. It is interesting to note that V_x increases with altitude.

2. The **Best-Rate-Climb speed** (V_y), the speed which gives the maximum gain in altitude for a given time. It is interesting to note that V_y decreases with altitude.

3. Maneuvering speed (V_a) is the speed used for penetration of turbulence — this speed will allow the aircraft to stall from gust load before structural failure occurs. It is generally considered to be $2 \times V_{so}$ (the stall speed in landing configuration).

There is one other speed that should be mentioned here and that is **True Air Speed** (TAS). True airspeed is, generally speaking, the indicated airspeed corrected for altitude and temperature and as such is a changing value of direct concern to the pilot in relation to the aircraft performance criteria.

All of the speeds discussed here that are not marked on the airspeed indicator dial are to be found in the aircraft owner's handbook and it is highly recommended that the pilot familiarize himself with them in order to achieve the maximum

from design performance. He will also become a safer and more knowledgeable pilot.

CONGRATULATIONS



CERTIFICATES ISSUED RECENTLY TO MONTANA FLYERS

STUDENTS

Blain, Monte W.—Billings
Baird, Nels R.—Lewistown
Larson, Donald E.—Williston, N.D.
Nielson, Jack C.—Billings
Findon, Donald F.—Milltown, N.J.
Hill, Frank C.—Powderville
Carroll, William J.—Billings
Wallace, Raymond R.—Libby
Lopez, James F.—Missoula
Phillips, James D.—Ashland
Trost, Delvin R.—Brady
Davant, John H.—New York, N.Y.
Drake, Jon F.—Billings
Gaffney, John E.—Orofino, Idaho

PRIVATE

Pekkala, Keith A.—Lewistown
Allie, Douglas B.—Glasgow
Ristow, Michael G.—Gardiner
Morgensen, Jeffrey P.—Helena
Johnson, Jerry M.—Lewistown
Wallace, Walter H.—Billings
Percy, Merrill E., Jr.—Miles City
Holder, William D.—Cody, Wyo.
Crilly, Donald P.—Billings
Sasich, George W.—Billings
Hanson, Greg K.—Scobey
Hatfield, William L.—Miles City
Rea, Grace V.—Bowman, N.D.
Ray, Edward D. Jr.—Ophiem AFB
Oglesby, Garry J.—Peerless
Etzel, Joseph A.—Poplar
Steiner, Peter J.—Missoula
Smith, Thomas C.—Cascade
McAvoy, Raymond—Great Falls
Bach, Dale F.—Great Falls
Cusick, Gary J.—Kalispell
Wallin, David A.—Bozeman
Guest, Michael A.—Kalispell
Deck, Earl D.—Great Falls
Heidlebaugh, Cecil P.—Loma
Ruffles, Royal F.—Danbury, Conn.
Hansen, Lee R.—Sidney
Schaeffer, Herbert E.—Great Falls

COMMERCIAL

Greeno, Dean E.—Rudyard
Wren, Patrick J.—Lakeville, Minn.

INSTRUMENT

Lund, Richard S.—Menlo Park, Calif.
Greeno, Dean E.—Rudyard
Wren, Patrick J.—Lakeville, Minn.
Nance, Jay T.—Birney
Cardon, Vern R.—Missoula
Skites, Ronald W.—Arlee

MULTI ENGINE

Hilton, Zitelle A.—Cody, Wyo.
Herrod, Bron T.—Billings
Lund, Richard S.—Menlo Park, Calif.
Crowder, David L.—Denver, Colo.
Kramer, Brother Marion, Ashland
Tidyman, James A.—Billings
Stroh, James P.—Billings

FLIGHT INSTRUCTOR

Gregson, Roger D.—Billings
Crowder, David L.—Denver, Colo.
Cebulski, Russell D.—Malta
Cadwell, Philip C.—Red Lodge
Lund, Richard S.—Menlo Park, Calif.

FLIGHT INSTRUCTOR INSTRUMENT

Crowder, David L.—Denver, Colo.
Lund, Richard S.—Menlo Park, Calif.

BASIC GROUND INSTRUCTOR

Taylor, Jeron—Glendive
Basham, Lauren D.—Helena

ADVANCED GROUND INSTRUCTOR

Lund, Richard S.—Menlo Park, Calif.
Greeno, Dean E.—Rudyard
Hulley, Bruce J.—Great Falls
Stradley, Roger I.—Belgrade

INSTRUMENT GROUND INSTRUCTOR

Lund, Richard S.—Menlo Park, Calif.
Greeno, Dean E.—Rudyard
Stradley, Roger I.—Belgrade
Hall, Kemper W.—Great Falls

GOLD SEAL

Stowe, John M.—Great Falls

ROTOCRAFT

Bartlett, George E.—Billings—Flight Instructor

SEA PLANE

Luther, Donald H.—Great Falls

SPECIAL TYPE RATINGS

Hardy, Elmer E.—Billings—(B-26)

SPECIAL PURPOSE

Lemire, Ray A.—Calgary, Alberta
Skocdopole, John E.—Olds, Alberta

AIRFRAME MECHANICS

Soare, Malcolm A.—Glendive
Buslett, Richard K.—Roundup

POWERPLANT MECHANICS

Buslett, Richard K.—Roundup

REPAIRMAN

AIRFRAME & ACCESSORY

Austin, Raymond E.—Helena

AVIATION EDUCATION HIGHLIGHTS



By C. R. "Ron" Adams
Supervisor of Aviation Education

During this time of the year, traveling slows almost to a standstill. As a result, I have not had the opportunity to visit many schools, but after the holiday season I hope to get out and see each school with an aviation program, plus those that are interested in beginning an aviation program.

GUIDANCE COUNSELORS

I did go to Red Lodge High School on November 30th to assist and take part in their Career Night program. At Red Lodge, we used a filmstrip and recording entitled, "Aviation—Where Career Opportunities are Bright". This is brand new and to my knowledge, the first time the completed package has been shown in public.

The filmstrip package is available through the National Aerospace Education Council, Room 616, 806-15th N.W. Washington, D.C. 20005.

The package consists of:

- (1) Filmstrip—156 frames in color, Parts 1 & 2;
- (2) Recording—33 1/3 RPM, 2 sides, 28 1/2 minutes.
- (3) Counselor's Guide.

The cost of this complete package is \$10.00.

We have included an order form for your convenience on page 11.

This was produced through the cooperative efforts of the Division of Vocational and Technical Education, U. S. Office of Education; the Office of General Aviation Affairs, Federal Aviation Administration; and the N. A. E. C., with the cooperation of the nation's aviation industry. You can see from this impressive list of producers that the filmstrip must contain some valuable information relative to aviation and its career opportunities.

As I mentioned earlier, this package was used at the Red Lodge High School Career Night and on several

other occasions. Personally, I think this is a fine piece of material, one that partially fills a void we have been faced with in this subject area. It would be an investment well spent.



If you are desirous of previewing the filmstrip before purchasing or you would like to use it right away, there is one copy available for loan. Write to me and I will place your name on the mailing list.

NASA SPACEMOBILE

The National Aeronautics and Space Administration's Spacemobile, which annually tours Montana schools in the fall, completed its 1967 tour on December 15. It is physically impossible to visit every school in the state during its month and a half stay. However, we endeavor to accomplish this within a four year period, if everything works out normally.

The Supervisor of Aviation Education is responsible for the scheduling of the Spacemobile into Montana schools. A number of schools have written directly to N. A. S. A. or the N. A. S. A. Regional Centers, requesting the Spacemobile be scheduled into their school. This only delays consideration of your request. N. A. S. A. forwards each of these requests to this office where we try to work them into the schedule.

Next year, it appears at this time, the Spacemobile will be in western Montana sometime during the latter part of October through the middle of December. If the Spacemobile has not visited your school in the last three years and you would like an appearance, let me know.

NOTE: We would also like to hear from schools where the Spacemobile has appeared. Any comments you might have or suggestions as to how we can improve any phase of this program would be appreciated.

WOULD A CAREER IN AVIATION INTEREST YOU?

The School of Aeronautics and Related Trades here in Helena has had a training program in aviation oriented and related programs for quite some time. The Missoula Vocational Technical Center is contemplating the inclusion of aviation training in some form into their program. Not duplicating Helena's efforts necessarily.

I would like to receive some indication of student interest in attending either of these schools with a notation as to whether flight or mechanical training is preferred.

If the superintendent, principal or counselor could take a few minutes to do this, it would certainly help us to design courses to meet the needs of the greatest number of students.

I would like to take this opportunity to wish you and yours a most joyous New Year. I am looking forward to working with you during 1968.

FAA IFR PILOT EXAM-O-GRAM NO. 21

"IFR WEIGHT AND BALANCE COMPUTATIONS"

Applicants preparing for the instrument pilot written examination should be familiar with weight and balance computations as they pertain to instrument flight. Although weight and balance is a prime consideration for every flight, instrument conditions make the consequences of improper loading particularly unsafe. If the total weight of the aircraft is beyond the maximum limit, there is an increase in stalling and landing speeds as well as a decrease in rate of climb, ceiling and safety factor in turbulent air. If the center of gravity is located outside of allowable limits, the stability of

the airplane may be affected and control forces may be erratic. Any of these adverse flight conditions add to the burden imposed on a busy pilot in an instrument environment.

When preparing for an instrument flight, the pilot should systematically check the weight and balance situation as part of his preflight planning. He should take into consideration:

1. Empty weight and center of gravity from airplane records.
2. Actual weights and seating locations of pilots and passengers.
3. Baggage weight and location.
4. Fuel as loaded, or at least a minimum to fly:
 - a. To first airport of intended landing.
 - b. To alternate (if required by FAR 91.83).
 - c. Forty-five minutes at normal cruising speed.

He should apply this information to the charts, tables or instructions in the Airplane Owner's Manual. If limitations are not exceeded, he can conduct a safe operation. If the loading is over maximum design weight or out of allowable center of gravity range, an adjustment must be made in order to maintain safe operations.

A typical weight and balance problem found in the Instrument Pilot Written Examination, or on an actual Instrument Flight, is presented here as an example.

Assume that you are planning a flight in a light twin-engine airplane and that your load consists of four passengers, full fuel, and 360 lbs. of baggage. The weight and balance computations for this flight may be approached and solved as follows:

A. Check the limitations in the Airplane Owner's Manual.

EXAMPLE OF OWNER'S MANUAL

Owner's Manual	
Pilot Seat	— 37.0"
Co-Pilot or Pass. seat	— 37.0"
2 Pass. Seats	— 71.7"
2 Pass. Seats	— 105.0"

Limitations

Max. Allowable Wt., 5,100 lbs.
C. G. Limits—35.0"—43.1":
Usable Fuel at—35.0"
130 gal. Max. 6 lbs. per gal.

Oil at 3.5"—24 Qts. 7.5 lbs. - gal.
Baggage at 63.0"—Nacelles 200 lbs.

B. Determine the Empty Weight and the Empty Weight Center of Gravity from the latest weight and balance report and the Airplanes Records.

Empty Wt. 3,450 lbs.
Empty Wt. Center of Gravity 36.5" from datum

C. Determine if the Maximum Allowable Weight is exceeded:

Empty Weight	3,450 lbs.
Pilot and passenger, 155+165 lbs.	320
Two passengers, 160+200 lbs.	360
One passenger, 170 lbs.	170
Baggage, Nacelles	200
Baggage, Aft Cabin	160
Fuel, full	780
Oil, full	45
	5,485 lbs.

The maximum allowable weight limit of 5,100 lbs. is exceeded by 385 lbs. This condition must be corrected before flight and before a check can be made on the center of gravity location. There are three parts of the useful load which can be off-loaded to reduce weight — fuel, baggage, or passengers. The selection of one or several of these possibilities depends upon the requirements for the flight.

If conditions are such that all passengers and their baggage need to go on the flight, you can carefully calculate your fuel requirements and reduce the fuel load to the minimum required by FAR 91.23.

FUEL REQUIRED FOR IFR FLIGHT

To the First Airport of intended landing	43 gal.
To the alternate airport (assume ceilings are low at first airport)	27
To fly 45 minutes at cruising speed	20
	90 gal.

You can reduce the fuel load to 90 gal., a reduction of 240 lbs. **This helps, but is not enough.** Now you must insist that either some of the baggage be off-loaded or someone stay home. For the sake of the problem, let's assume that you remove 145 lbs. of baggage from the nacelles. The total weight is thereby reduced 385 lbs., bringing the airplane weight within the maximum allowable limit.

D. Determine if the Center of Gravity is within limits. Although many Owner's Manuals provide shortcut methods, Center of Gravity can always be calculated by dividing total moments by total weight. Moments are a product of weight times arm for each item and the arm is an indication of the location of the item expressed in inches from a standard datum line. Using the arms given

in the owner's manual and the weights calculated in step C above you obtain:

Item	Weight (lbs.)	Arm (in.)	Moments
Empty Weight	3450	36.5	125925.0
Pilot & Pass.	320	37.0	11840.0
Two passengers	360	71.7	25812.0
One passenger	170	105.0	17850.0
Baggage (Nacelles)	55	63.0	3465.0
Baggage (aft cabin)	160	124.0	19840.0
Fuel	540	35.0	18900.0
Oil	45	3.5	157.5
	5100		223789.5

CENTER OF GRAVITY

$$223,789.5 \div 5,100 = 43.88$$

Out of limits again! These calculations show that the center of gravity is located .78" behind the aft limit, and an unsafe flight condition exists.

You can make a correction by moving some of the heavier loads to relatively forward locations. This can be accomplished by having the passengers swap seats or by moving some baggage to forward compartments. In this case, we assume that you elect to shift 145 lbs. of baggage from the aft cabin to the nacelles; now, the moments for these items are:

	Weight	Arm	Moments
Baggage (Nacelles)	200	63.0	12600.0
Baggage (Aft Cabin)	15	124.0	1860.0

When these new moments are used in the calculations, we find that the total moments have changed to 214944.5, even though the total weight remained constant at 5,100 lbs.

CENTER OF GRAVITY

$$214,944.5 \div 5,100 = 42.15$$

—WITHIN LIMITS! —

The weight and balance problem for the flight has been solved—and a dangerous flight condition has been averted. By carefully limiting fuel to that required for the flight and by proper placement of the baggage, all limitations have been observed. All passengers can go on the flight, and you are assured that, as far as weight and balance is concerned, your preflight action will result in a safe IFR flight.

Airline travel accounts for more inter-city passenger miles than do the railroads and bus lines combined by a margin of three to two.

The Russian airline, Aeroflot, is currently training its first all-female flight crew to fly the large four-engine, turboprop Ilyushin Il-18 in regularly scheduled service.

WINTER WEATHER NOTES

By R. A. DIGHTMAN
WBAS — Helena

Montana and the Sky has printed several weather items over the years, devoted mostly to seasonal aviation weather types frequently encountered in the Northern Rocky Mountains. Montana veterans know that it is a most unusual winter that does not produce at least a little "real" winter, it may be worth while just to mention a few of the more common weather items of importance to aircraft operations.

Low-level mechanical turbulence in strong winds blowing over mountain ranges has been given much attention over the years—attention that is well deserved. Most common when "chinook" winds follow a cold wave, this turbulence type will be a part of any weather system carrying strong winds in the lower levels of the atmosphere.

The loss of horizon often experienced when flying over deep freshly-fallen snow, while not too common in mountain areas because not all features of the terrain are covered, is a real hazard in flatter areas where roads, fences, etc., usually available for visual reference, are under a blanket of white. This phenomenon is compounded if snow is falling—even though visibility may be several miles—because of the lack of background detail. This means, for example, that a visibility of 6 miles with a snow-cover for a background, is not as good as it would seem.

Such things as frosty wings on an outdoor-parked aircraft, a clear, cold night; thick oil in colder conditions (temperature 0° or lower); stiff tires; icy landing strips; fog near open water on still, cold mornings; icing sometimes in cloud edges that look deceptively thin; and fogged or iced windshields, are only a few of the miscellaneous winter effects on aircraft, especially during cold spells.

The ESSA, Weather Bureau, recently published a set of Winter Storm Safety Rules. This list is reproduced here; with a little imagination many of the rules will be seen to apply to winter flying operations:

WINTER STORM SAFETY RULES

Keep ahead of the winter storm by listening to the latest ESSA Weather Bureau warnings and bulletins on radio and television.

—Check battery powered equipment before the storm arrives. A portable radio or television set may be your only contact with the world outside the winter storm. Also check emergency cooking facilities and flashlights.

—Check your supply of heating fuel. Fuel carriers may not be able to move if a winter storm buries your area in snow.

Check your food and stock an extra supply. Your supplies should include food that requires no cooking or refrigeration in case of power failure.

—Prevent fire hazards due to overheated coal or oil burning stoves, fireplaces, heaters, or furnaces.

—Stay indoors during storms and cold snaps unless in peak physical condition. If you must go out, avoid overexertion.

—Don't kill yourself shoveling snow. It is extremely hard work for anyone in less than prime physical condition, and can bring on a heart attack, a major cause of death during and after winter storms.

—Rural residents: Make necessary trips for supplies before the storm develops or not at all; arrange for emergency heat supply in case of power failure; be sure camp stoves and lanterns are filled.

Dress to fit the season. If you spend much time outdoors, wear loose-fitting, light-weight, warm clothing in several layers; layers can be removed to prevent perspiring and subsequent chill. Outer garments should be tightly woven, water repellent, and hooded. The hood should protect much of your face and cover your mouth to ensure warm breathing and protect your lungs from the extremely cold air. Remember that entrapped, insulating air, warmed by body heat, is the best protection against cold. Layers of protective clothing are more effective and efficient than single layers of thick clothing; and mittens, snug at the wrists, are better protection than fingered gloves.

Your automobile can be your best friend — or worst enemy — during winter storms, depending on your preparations. Get your car winterized before the storm season begins. Everything on the checklist shown below should be taken care of before winter storms strike your area.

Ignition system — heater — battery — brakes perfectly adjusted — lights — tire tread — wiper blades — cooling system — defroster — fuel system — snow tires installed — lubrication — chains — exhaust system tight — antifreeze — winter grade oil.

Keep water out of your fuel by maintaining a FULL tank of gasoline.

Be equipped for the worst. Carry a winter storm kit, especially if cross country travel is anticipated or if you live in the northern states.

Suggested Winter Storm Car Kit: blankets or sleeping bags, matches and candles, empty 3-pound coffee can with plastic cover, facial tissue, paper towels, extra clothing, high-calorie nonperishable food, compass and road maps, knife, first aid kit, shovel, sack of sand, flashlight or signal light, windshield scraper, booster cables, two tow chains, fire extinguisher, catalytic heater, axe.

Winter travel by automobile is serious business. Take your travel seriously.

—If the storm exceeds or even tests your limitations, seek available refuge immediately.

—Plan your travel and select primary and alternate routes.

—Check latest weather information on your radio.

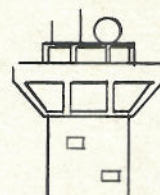
—Try not to travel alone; two or three persons are preferable.

—Travel in convoy with another vehicle, if possible.

Always fill gasoline tank before entering open country, even for a short distance.

—Drive carefully, defensively.

Steam catapults that launch aircraft off the decks of aircraft carriers give a powerful "push". A plane is launched from a standing start, or zero mph, to about 200 mph within a run of 250 feet.



TOWER

OPERATIONS

NOVEMBER, 1967

	Total Operations	Instrument Operations
Billings	9,370	1,588
Great Falls	9,155	1,346
Missoula	5,772	434
Helena	4,140	318

WIND FACTOR CHART

COOLING POWER of WIND on EXPOSED FLESH EXPRESSED as EQUIVALENT TEMPERATURE
(Under Calm Conditions)

		Actual Thermometer Reading (* F)											
WIND SPEED		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
KNOTS	MPH	EQUIVALENT TEMPERATURE (* F)											
Calm		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
4	5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
9	10	40	28	16	4	-9	-21	-33	-46	-58	-70	-83	-95
13	15	36	22	9	-5	-18	-36	-45	-58	-72	-85	-99	-112
17	20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
22	25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
26	30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
30	35	27	11	-4	-20	-35	-49	-67	-82	-98	-113	-129	-145
35	40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind Speeds Greater Than 40 mph have little additional effect		LITTLE DANGER (For properly clothed person)				INCREASING DANGER				GREAT DANGER			

ORDER FORM

AVIATION — WHERE CAREER OPPORTUNITIES ARE BRIGHT

A filmstrip, recording, and Counselor's Guide \$10.00 for complete package distributed by the
National Aerospace Education Council

Please send.....complete filmstrip package(s) @ \$10. Amount enclosed \$

Bill my school. Purchase order attached

Make check payable to

NATIONAL AEROSPACE EDUCATION COUNCIL

Room 616, 806 15th St. NW Washington, D. C. 20005

Name.....

Please print

Address.....

Street

City

State

Zip

GREAT FALLS FSS RECEIVES NEW PHONE NUMBER

As of December 12, 1967, the Great Falls Flight Service Station local service telephone number will be changed to:

761-1110

"One Call" pilot weather briefing will also be inaugurated on December 12th from Flight Service Station at Great Falls.

MEMBER

NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS

PURPOSE:—"To foster aviation as an industry, as a mode of transportation for persons and property and as an arm of the national defense; to join with the Federal Government and other groups in **research, development, and advancement of aviation**; to develop uniform laws and regulations; and to otherwise encourage co-operation and mutual aid among the several states."

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